UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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			EXAMINER
22186	7590	08/18/2004	LERNER, MARTIN

MENDELSOHN AND ASSOCIATES PC
1515 MARKET STREET
SUITE 715
PHILADELPHIA, PA 19102

ART UNIT	PAPER NUMBER
2654	

DATE MAILED: 08/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 to 27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 to 27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 April 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All   b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *20 April 2001*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1.   The drawings are objected to because, in Figure 2, "r[n]" should be –r'[n]—. See Page 6, Line 28 to Page 7, Line 2.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement-drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheets should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the examiner does not accept the changes, Applicants will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2.   The title of the invention is not descriptive. A new title is required that is clearly

indicative of the invention to which the claims are directed.

The following title is suggested: Multi-Pulse Speech Coding with Reduced

Convolution Processing.

3.   The disclosure is objected to because of the following informalities:

On page 7, lines 11 to 12, "pulses 350-360" should be – pulses 340-350 –. See

Figure 4.

On page 7, line 22, "are" should be –is—.

On page 7, line 26, "increase" should be –increases—.

On page 8, line 14; on page 8, line 20; on page 11, line 12; on page 14, line 8;

and on page 15, line 13, "G.732.1" should be –G.723.1—.

On page 13, line 14, "memory 420" should be –memory 520—. See Figure 6.

On page 15, line 27, "process" should be –processed—.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4.   The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of
> making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the
> art to which it pertains, or with which it is most nearly connected, to make and use the same and shall
> set forth the best mode contemplated by the inventor of carrying out his invention.

5.   Claims 1 to 27 are rejected under 35 U.S.C. 112, first paragraph, as failing to

comply with the enablement requirement. The claims contains subject matter which

was not described in the specification in such a way as to enable one skilled in the art to

which it pertains, or with which it is most nearly connected, to make and/or use the

invention.

Regarding independent claims 1, 10, 18, and 23, there is insufficient enablement

for the limitations of "wherein the step of convolving does not multiply at least one zero

value of the first pulse stream with a respective value of the second signal" and

"wherein the convolution device does not multiply at least one zero value of the first

pulse stream with a respective value of the second signal." There is insufficient

enablement for the corresponding limitations of claims 2, 3, 11, 12, 19, and 24.

There is insufficient enablement for the limitation of not multiplying at least one

zero value because, in an algorithmic sense, it is not clear how not multiplying by zero is

different from multiplying by zero. Arithmetic logic units rely upon Boolean tables to

multiply binary numbers. Thus, any multiplication in an arithmetic logic unit involves

testing whether either of inputs is a zero, and if either of the inputs is a zero, then the

result is zero, automatically, from the Boolean table. Conventionally, an arithmetic logic

unit does not multiply by zero if either of the multiplicands is a zero. It is unclear what

the distinction is from a conventional multiply by zero algorithm to require that the

convolution device does not multiply at least one zero value.

Moreover, Applicants' Table 2 does not provide enablement on how the

convolving step does not multiply at least one zero value. Table 2, on Pages 10 to 11 of

the Specification, differs from the conventional algorithm set forth in Table 1, on Pages

9 to 10 of the Specification, by an "xloc[I]" syntax. However, it is not apparent how an

"xloc[I]" syntax avoids multiplying by zero, or more generally, how the algorithm of Table

2 avoids multiplying by zero. The claims do not require any particular syntax or

algorithm to perform the step of not multiplying at least one zero value. Thus, there is a

lack of enablement as to how the algorithm of Table 2 does not multiply at least one

zero value, and how the disclosed embodiments distinguish over a conventional prior

art algorithm for multiplying by zero.

Claim Rejections - 35 USC § 103

6.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

7.   Claims 1 to 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Kim et al. in view of *Cutter et al.*

Regarding independent claims 1, 10, and 18, *Kim et al.* discloses a method and

device for generating an encoded speech signal of quantized pulse target vectors by

G.723.1, comprising:

"generating a first pulse stream containing at least one pulse and a quantity of

zero values" – an amplitude of a pulse target vector, $v_i(n) = 0$, +1, or -1, is given by

Equation 2 (column 3, lines 33 to 46); thus, pulse target vector $v_i(n)$ is "a first pulse

stream" consisting of zero values and a quantity of positive and negative pulses at
positions n;

"convolving the first pulse stream with a second signal to produce a third signal"
– a composite sound is composed with the target vector $v_i(n)$, obtained by Equation 2,
an impulse response $h[n]$ of $S(z)$ and convolution, to obtain s_i' as given by Equation 3
(column 3, lines 46 to 55); thus, impulse response $h[n]$ ("a second signal") is convolved
with target vector $v_i(n)$ ("a first pulse stream") to obtain s_i' ("a third signal").

Concerning independent claims 1, 10, and 18, the only element not expressly
disclosed by *Kim et al.* is "wherein the step of convolving does not multiply at least one
zero value of the first pulse stream with a respective value of the second signal." *Kim et
al.* discloses the target vector, $v_i(n) = 0$, takes on zero values, and a convolution
operation of $v_i(k)$ and $h[n - k]$, for $k = 0$ to 59, for 60 sample positions for pulses in a sub-
frame, must necessarily determine a result when $v_i(n) = 0$. The only question is whether
Kim et al., in fact, performs a multiplication operation to obtain a result when $v_i(n) = 0$. It
is contended that a conventional arithmetic logic unit would not actually perform a
multiplication operation, *per se*, when either of the multiplicands is a zero, but would
simply test if either of the inputs is zero, and if either input is zero, generate a zero for
an output. However, in any event, *Cutter et al.* teaches a method and apparatus for
performing an algorithm for a Fast Fourier Transform, wherein it is suggested that to
multiply by zero, an arithmetic logic unit merely resets the value being multiplied to zero
rather than going through a full multiply operation. Multiply operations for multiplying by
one or zero are not performed. (Column 5, Lines 58 to 75) It is stated that the

advantage is to allow implementation of an algorithm for a Fast Fourier Transform using a reduced number of address counters and reduced storage requirements. (Abstract) Thus, it would have been obvious to one having ordinary skill in the art to not multiply at least one zero value as taught by *Cutter et al.* in the convolving operation of multiplying a zero value of a first pulse stream with a respective value of a second signal of *Kim et al.* for the purpose of reducing the number of address counters and reducing storage requirements.

Regarding independent claim 23, *Kim et al.* discloses a device for generating an encoded speech signal, further comprising:

" a speech processor that processes the convolved signal using a filter to generate the communication signal" – formant post-filter employing multi-degree LPC coefficients provide improved speech quality (column 4, line 58 to column 5, line 42: Figures 1 and 4).

Regarding claims 2 to 5, 11 to 13, 19 to 20, and 24 to 25, *Kim et al.* discloses pulse target vector, $v_i(n) = 0$, +1, or -1, has pulses +1 and −1 among 60 samples of a sub-frame; a remainder of the sample positions are values of zero; implicitly, it is known there are a minority of pulses in a sub-frame and a majority of zeros, i.e. a few pulses are scattered among the 60 positions; *Cutter et al.* suggests not multiplying by zero for all instances where a multiplicand is zero (column 5, lines 58 to 75); thus, *Cutter et al.* teaches not multiplying "a substantial number of zero values" and not multiplying

"essentially all of the zero values"; only the pulses, i.e. $v_i(n)$ = pulses +1 or −1, are multiplied.

Regarding claims 6, 7, 16, and 17, *Kim et al.* discloses Multi Pulse Maximum Likelihood Quantization (MP-MLQ) (Abstract; column 1, line 64 to column 2, line 2; column 2, line 66 to column 3, line 14: Figure 2) and Algebraic CELP (ACELP) (column 1, line 45: Figure 1).

Regarding claims 8, 9, 14, 15, 21, and 26, *Kim et al.* discloses target vector $v_i(n)$ ("a first pulse stream"), which represents an excitation signal, and impulse response $h[n]$ ("a second signal") (column 3, lines 33 to 55).

Regarding claims 22 and 27, *Kim et al.* discloses MP-MLQ encodes a residual signal, r[n] (column 5, line 44 to column 6, line 51: Figure 5).

Conclusion

8.   The prior art made of record and not relied upon is considered pertinent to Applicants' disclosure.

Kuhn et al. suggests speech processing where multiplying by zero is avoided so a resultant factor may be ignored. (Column 4, Lines 4 to 14)

Blomgren suggests multiplication by zero is always zero and can be ignored. (Column 7, Line 53 to Column 8, Line 12)

Tian and Flomen et al. disclose G.723.1 audio encoding of pulses by convolution of an excitation signal and an impulse response.
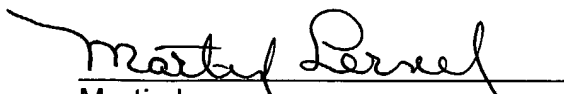
Ketchum et al. discloses related art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin Lerner whose telephone number is (703) 308-9064. The examiner can normally be reached on 8:30 AM to 6:00 PM Monday to Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil can be reached on (703) 305-9645. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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8/11/04

Martin Lerner
Examiner
Group Art Unit 2654